

REMARKS

Claims 1-126 are pending in the application. Claims 51-126 have been withdrawn from consideration. The drawings were objected to under 37 C.F.R. §1.83(a) as failing to show every feature of the invention specified in the claims. The specification was objected to because the abbreviations or acronyms LIP, HSSDC and JBOD are cited throughout the specification without explanation. Claims 27 and 42-45 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claims 1-50 were rejected under 35 U.S.C. §112, second paragraph, as failing to point out and distinctly claim the subject matter that the Applicant claims as the invention. Claims 1, 18-21, 26, 27, 33-37, 40-43 and 46 were rejected under 35 U.S.C. §102(b) as being anticipated by Dawson. Claims 44 and 45 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dawson. Claims 2-11 and 22-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Brewer. Claims 38, 39 and 47-49 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Lin. Claims 12-17, 28-32 and 50 were found to be allowable if rewritten to overcome the rejections under 35 U.S.C. §112 and to include all of the limitations of the base claim and any intervening claims. Claims 1, 43 and 46 have been amended, without new matter. Reconsideration and reexamination of the application in view of the amendments and following remarks is respectfully requested.

The drawings were objected to under 37 C.F.R. §1.83(a) as failing to show every feature of the invention specified in the claims. The Examiner stated that "the arrangement connectable at points within the hub and between at least two different pairs of stations" and "stations connected with other stations in one lobe of the main loop" must be shown in the drawings or cancelled from the claims. Claim 1 has been amended to recite that the arrangement is "selectively connectable at points within the hub" and to remove the potentially confusing "pairs of the stations" language to make it clear that the arrangement is selectively connectable between at least two different stations, not two different pairs of stations. Similarly, claim 46 has been amended to recite that monitoring is performed at a "selectable plurality of points" and between "at least two different stations," not two different pairs of stations. No new matter has been added (see page 5 line 28.) With the amendments to claims 1 and 46, it is submitted that the objection has been overcome.

An "arrangement 106" is described on page 5, line 22 of the specification, and identifies the fixed diagnostics unit (FDU) 108 and roving diagnostic unit (RDU) 110 in FIG. 2. From FIG. 2 and the specification, it is evident that the arrangement is selectively connectable at points within the hub. For example, in FIG. 1 the FDU 108 of arrangement 106 is connected to point 112 on the loop. This is described on page 5, lines 25-26. The RDU 110 in FIG. 2 is connected to Port 1, but it may also be selectively connected to other ports as illustrated by arrow 116 and described on page 5, lines 26-28. FIG. 7 illustrates that the RDU 110 of arrangement 106 is selectively connectable between at least two stations S1 and S2.

As described on page 5, lines 19-20, a "lobe" is a station connected to a loop via a port, which may also include an adapter for the port. "[S]tation or stations connected to each of the ports of the hub forming a lobe of the main loop," as recited in claims 39 and 44, are illustrated throughout the figures, such as FIG. 2, for example.

The specification was objected to because the abbreviations or acronyms LIP, HSSDC and JBOD are cited throughout the specification without explanation. The specification has been amended to provide an explanation of these terms. No new matter has been added. With the amendments to the specification, it is respectfully submitted that the objection to the specification has been over come.

"LIP" is an acronym for Loop Initialization Primitive, as found on page 10, line 3. The paragraph beginning on page 8, line 36 of the specification has been amended to identify LIP. "HSSDC" is an acronym for High Speed Serial Data Connector. The paragraph beginning on page 13, line 35 has been amended to identify HSSDC. "JBOD" is an acronym for Just a Bunch of Disks. The paragraph beginning on page 26, line 13 of the specification has been amended to identify JBOD.

Claims 27 and 42-45 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Claim 43 has been amended to replace "isolates" with "identifies." The rejection of claims 27, 42, 44 and 45 under 35 U.S.C. §112, first paragraph is

respectfully traversed. With claim 43 amended, it is respectfully submitted that the rejection of claim 43 under 35 U.S.C. §112, first paragraph has been overcome.

The Examiner stated that claim 27 lacked enablement because the specification does not describe how to verify Fibre Channel compliance. As described in the paragraph beginning at page 9, line 39 of the specification, Fibre Channel compliance is verified in part by determining that valid ordered sets are present, where each ordered set is comprised of four 10-bit characters (40-bit patterns) called out in the Fibre Channel standard FC-0. The present invention monitors a particular group of ordered sets. As described in the paragraph beginning at page 10, line 9 of the specification, Fibre Channel compliance is also verified by detecting five operational loop states, including the states INOPERATIVE, INITIALIZING, OPEN-INIT, UP and UP+FRAMES, using ordered set detection and two additional detectors, an UNKNOWN detector and a LINK-USEABLE detector. Fibre Channel compliance and the determination of a good or bad loop is also verified by the detection of an unknown operational loop state.

The Examiner stated that claim 42 lacked enablement because the specification does not describe how to invalidate Fibre Channel characters. Claim 42 recites Fibre Channel characters "subject to invalidation," which simply means that they contain errors and may be identified as invalid. Claim 42 further recites that the "arrangement is configured for identifying invalid ones of the Fibre Channel characters." As described in the paragraph starting on page 10, line 9 of the specification, invalid Fibre Channel characters are identified by the LINK-USEABLE detector, which checks the transition density (an indication of invalid characters on the loop). In addition, as described in the paragraph beginning at page 9, line 39 of the specification, invalid Fibre Channel characters are identified by checking for Fibre Channel compliance (i.e. invalid characters are identified when invalid ordered sets are detected).

The Examiner stated that claim 43 lacked enablement because the specification does not describe how to isolate the invalid Fibre Channel characters. Claim 43 has been amended to replace "isolates" with "identifies." Identifying invalid Fibre Channel characters is described in the specification as mentioned in the previous paragraph.

The Examiner stated that claim 44 lacked enablement because the specification does not describe how to indicate a defect associated with invalid Fibre Channel characters. However, as described on page 9, lines 25-28 of the specification, a system administrator can be notified of a defect in the form of an e-mail message. In addition, as described on page 12, lines 1-3, beaconing may be employed to identify the actual physical location of a removed defect, and on page 20, lines 32-33, the RDU identifies the error to a hub port so that the administrator knows which connection to explore.

The Examiner stated that claim 45 lacked enablement because the specification does not describe how to provide a recommendation to check or replace a particular lobe. However, as described on page 9, lines 25-28, the notification to a system administrator of a failed port is a recommendation to check or replace a particular lobe. In addition, as described on page 11, lines 38-40, multi-point data may be used to generate status data which identify the source of a problem, which is a recommendation to check or replace a particular lobe. Furthermore, as described on page 20, lines 30-38, visible error domains, the source address of a bad data frame, and invalid Fibre Channel Words are all recommendations to check or replace a particular lobe.

Claims 1-50 were rejected under 35 U.S.C. §112, second paragraph, as failing to point out and distinctly claim the subject matter that the Applicant claims as the invention. Claims 1 and 46 have been amended. With claims 1 and 46 amended, it is respectfully submitted that the rejection of claims 1 and 46 under 35 U.S.C. §112, second paragraph has been overcome. The rejection of claims 2-45 and 47-40 is respectfully traversed.

The Examiner states that with regard to claims 1 and 46, it is unclear what “two different pairs of the stations” means. As mentioned above, claims 1 and 46 have been amended to replace “two different pairs of the stations” with “two different stations.” As amended, it is submitted that claims 1 and 46 are now clear.

The Examiner states that with regard to claims 2-17, it is unclear what “ordered set” means. However, as described on page 10, line 1 and page 11, lines 3-5, ordered sets are four ten-bit

characters, where the first 20 bits indicate what type of ordered set it is, while the next 20 bits give further details about the ordered set which usually indicates the address of the station the ordered set came from.

The Examiner states that with regard to claims 40 and 41, it is unclear what "transition density of the digital data" means. However, as described on page 10, lines 20-21, transition density is a crude indication of invalid characters on the loop.

The Examiner states that with regard to claims 22-25, it is unclear what "station being physically receivable in one or the ports" means, and what "receiving a station in a port" means. A station is physically receivable in a port when it can be connected to a port via fiber optic cables or adapters, the connection of which may be short or quite long, essentially making the port ready for insertion into the main loop as determined by the signal present. This is also what is meant by receiving a station in a port. This is described on page 5, lines 13-19.

Claims 1, 18-21, 26, 27, 33-37, 40-43 and 46 were rejected under 35 U.S.C. §102(b) as being anticipated by Dawson. With the amendments to claims 1 and 46, it is respectfully submitted that this rejection has been overcome.

The present invention is directed to diagnosis and recovery in high performance digital loops such as those in Fibre Channel systems. In such digital loops, a plurality of stations are interconnected within a hub such that digital data flows between the stations based on the operational status of the system. An "arrangement" comprised of a fixed diagnostics unit (FDU) and a roving diagnostic unit (RDU) can be selectively connected to different points and ports within the hub and between two stations for monitoring certain characteristics of the data in a way that provides for non-invasive identification of one or more conditions related to the operational status of the system. In one embodiment, an RDU along with one or more port control circuits (PCCs) form part of a diagnostic or inner loop selectively configured such that data flows in the opposite direction of the main loop. The use of a counter-rotating loop may be realized by every port containing an RDU/FDU/PCC. Data on the main loop is copied onto the diagnostic loop by one of the PCCs and

travels around the diagnostic loop to the RDU in a non-intrusive manner such that operation of the main loop is not affected.

Dawson completely fails to teach an arrangement selectively connectable at points within the hub that provides for non-invasive identification of conditions. Although the Examiner equates a network management station (NMS) in Dawson with the "arrangement" of the present invention, the NMS operates in an entirely different manner from the arrangement of the present invention. The NMS in Dawson is coupled into the system as one of several communication stations (see col. 8 lines 29-31 and col. 11 lines 32-34) arranged in a ring (see col. 7 lines 40-42 and FIG. 1). The NMS is contained in one concentrator 60, where the concentrator provides a hub only for those stations connected to that concentrator (see col. 8 lines 6-31 and FIG. 2). The NMS is therefore coupled into the ring at a fixed location, and is not "selectively connectable at points within the hub" as recited in claim 1. It also cannot "monitor said digital data at a selectable plurality of points distributed within the hub" as recited in claim 46.

The Examiner refers to FIG. 11 as disclosing an arrangement connectable at points within the hub, but FIG. 11 merely shows two concentrators containing five stations connected in a ring. A network management module (NMM) located each concentrator must relay monitoring results to the NMS, which is not present in FIG. 11 (see col. 25, lines 32-35). Because the NMS is not selectively connectable to the points (port logic units) within FIG. 11, loss metric results must be relayed to the NMS through the ring.

Moreover, because the NMS of Dawson is one of the communication stations that comprise the ring, the connection of the NMS into the ring modifies the structure of the ring. An invasive or intrusive monitoring device modifies the structure of the loop, and can therefore introduce its own problems and affect the performance of the loop (see page 1, lines 33-39). Because use of an NMS modifies the structure of the ring and forces data to pass through the NMS, the NMS is an invasive monitoring device. In contrast, claims 1 and 46 recite non-invasive monitoring.

Because Dawson does not disclose all of the limitations of claims 1 and 46, it is submitted that the rejection of claims 1 and 46 under 35 U.S.C. §102(b) as being anticipated by Dawson has been overcome. In addition, because claims 18-21, 26, 27, 33-37 and 40-43 depend from claim 1, the rejection of these claims is also traversed for the same reasons provided above with respect to claim 1.

Claims 44 and 45 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dawson. Claims 44 and 45 depend from claim 1. With the amendments to claim 1, it is respectfully submitted that this rejection has been overcome.

As described above with regard to claim 1, claims 44 and 45 recite an arrangement "selectively connectable at points within the hub" that provides for "non-invasive identification of one or more conditions." Dawson fails to disclose either of these limitations. Furthermore, Dawson fails to teach or suggest, and in fact teaches away from an arrangement selectively connectable at points within the hub. In Dawson, NMMs permanently coupled within each concentrator relay loss metric results to an NMS. The complete loss metric results from each NMM are required to isolate a fault. In other words, Dawson relies on fixed monitoring devices, not selectively connectable devices, to relay information to an NMS to determine the location of a fault. An arrangement selectively connectable at points within a hub would be completely contrary to the teachings of Dawson.

Because Dawson does not disclose, teach or suggest all of the limitations of claims 44 and 45, it is submitted that the rejection of claims 44 and 45 under 35 U.S.C. §103(a) as being unpatentable over Dawson has been overcome.

Claims 2-11 and 22-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Brewer. Claims 2-11 and 22-25 depend from claim 1. With the amendments to claim 1, it is respectfully submitted that this rejection has been overcome.

As described above with regard to claims 44 and 45, claims 2-11 and 22-25 recite an arrangement "selectively connectable at points within the hub" that provides for "non-invasive

identification of one or more conditions." Dawson fails to disclose either of these limitations. Furthermore, Dawson fails to teach or suggest, and in fact teaches away from an arrangement selectively connectable at points within the hub. In Dawson, NMMs permanently coupled within each concentrator relay loss metric results to an NMS. The complete loss metric results from each NMM are required to isolate a fault. In other words, Dawson relies on fixed monitoring devices, not selectively connectable devices, to relay information to an NMS to determine the location of a fault. An arrangement selectively connectable at points within a hub would be completely contrary to the teachings of Dawson.

In addition, Brewer contains no disclosure at all related to an arrangement "selectively connectable at points within the hub" that provides for "non-invasive identification of one or more conditions," and in fact teaches away from such an arrangement. Brewer discloses a hub port in a hub of a loop that contains a detection circuit for detecting loop failure initialization data received from its attached node port. Upon detecting the loop failure initialization data, the hub port performs a loop failure initialization sequence, then enters a bypass mode which enables data to bypass the hub port. Each node requires a hub port if the node is to be bypassed upon detection of a failure. Thus, Brewer teaches away from an arrangement selectively connectable at points within the hub.

Because neither Dawson nor Brewer discloses, teaches or suggests all of the limitations of claims 2-11 and 22-25, it is submitted that the rejection of claims 2-11 and 22-25 under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Brewer has been overcome.

Claims 38, 39 and 47-49 were rejected under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Lin. Claims 38 and 39 depend from claim 1, and claims 47-49 depend from claim 46. Claims 1 and 46 have been amended. With claims 1 and 46 amended, it is respectfully submitted that the rejection of claims 38, 39 and 47-49 under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Lin has been overcome.

As described above with regard to claims 44 and 45, claims 38 and 39 recite an arrangement "selectively connectable at points within the hub" that provides for "non-invasive identification of one or more conditions." Similarly, claims 47-49 recites hub that monitors digital data "at a plurality of points distributed within the hub" that provides for "non-invasive identification of one or more conditions." Dawson fails to disclose either of these limitations. Furthermore, Dawson fails to teach or suggest, and in fact teaches away from an arrangement selectively connectable at points within the hub. In Dawson, NMMs permanently coupled within each concentrator relay loss metric results to an NMS. The complete loss metric results from each NMM are required to isolate a fault. In other words, Dawson relies on fixed monitoring devices, not selectively connectable devices, to relay information to an NMS to determine the location of a fault. An arrangement selectively connectable at points within a hub would be completely contrary to the teachings of Dawson.

In addition, Lin contains no disclosure at all related to an arrangement "selectively connectable at points within the hub" that provides for "non-invasive identification of one or more conditions." Lin discloses an implementation of the loop initialization process whereby one or more of the nodes contains a control register having an "autoswap" bit which reduces the retransmission latency of nodes in the loop and reduces the propagation delay of the smallest initialization data frame around the loop. The autoswap bit and associated circuitry of Lin is present in every node, and is therefore not selectively connectable to nodes in the loop. Lin is solely concerned with initialization of the loop, not the identification of one or more conditions.

Because neither Dawson nor Lin discloses, teaches or suggests all of the limitations of claims 38, 39 and 47-49, it is submitted that the rejection of claims 38, 39 and 47-49 under 35 U.S.C. §103(a) as being unpatentable over Dawson in view of Lin has been overcome.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If, for any reason, the Examiner finds the application other than in condition for allowance, Applicants request that the Examiner contact the undersigned attorney at the Los Angeles telephone number (213) 892-5752 to discuss any steps necessary to place the application in condition for allowance.

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, Applicants petition for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 491442004600.

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Respectfully submitted,

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